
Knowledge and Skill Chains in Engineering and Manufacturing

Information Infrastructure in the Era of Global Communications

IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is less rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is in information may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

Knowledge and Skill Chains in Engineering and Manufacturing Information Infrastructure in the Era of Global Communications

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Preface

Since the first DIISM conference, which took place 9 years ago, the world has seen drastic changes, including the transformation of manufacturing and engineering software, and the information and communication technologies deployed. The conditions for manufacturing and engineering have changed on a large scale, in terms of technology-enabled collaboration among the fields of design, engineering, production, usage, maintenance and recycling/disposal. These changes can be observed in rapidly-growing fields such as supply chain management. As for production technologies at factory floors, new visions on human-machine co-existing systems involve both knowledge management and multi-media technologies. Therefore, because of these changes, the importance of information infrastructure for manufacturing has increased, stunningly. Information infrastructure plays a key role in integrating diverse fields of manufacturing, engineering and management. This, in addition to its basic role, as the information and communication platform for the production systems. Eventually, it should also serve the synthetic function of knowledge management, during the life cycles of both the production systems and their products, and for all stakeholders.

Over the past decade, the conference objectives have reflected changes of the engineering, manufacturing and business processes due to the advancements of information and communication technologies. The Fifth International Conference on Design of Information Infrastructure Systems for Manufacturing (DIISM 2002) held November 18-20, 2002 at Osaka University, in Osaka carried the theme: “Enhancing Engineering and Manufacturing Knowledge and Skill Chains in the era of Global Communications”. The theme expresses both the wide scope and the technical depth that we are faced with in designing the information infrastructure for manufacturing. Yet, the globality and connectedness of the economic fabric and its problems obliges us to contain it... a mission impossible? Yes, if we stick to the traditional divide of mono-disciplinary academia and product-by-product industry. But do we have an alternative? Let us recall Hiroyuki Yoshikawa’s vision of technical cooperation transcending cultural differences (among nations and among industry and academia) as set out in his keynote address to the 1st DIISM in Tokyo, November 1993. This vision has been guiding the global research programme on Intelligent Manufacturing Systems (www.ims.org). Over its five editions the DIISM working conferences have enjoyed very valuable contributions from several industry-led IMS projects such as Globeman 21, Next Generation Manufacturing Systems, Holonic Manufacturing Systems, Gnosis, Globemen, Mission, Humacs and Prodchain. The DIISM community has been honored to include these projects’ contributions, facilitating interchange of ideas within these projects and with others outside of the projects.

The information infrastructure supportive of improving the state of “manufacturing industries as a whole” as Yoshikawa described it, must draw

on both academic and industrial excellence, vision, knowledge, skill and ability to execute. It must support a wide range of scenarios, and involves an ever growing variety of devices, software and knowledge.

At the conference a great number of prominent experts from both academia and industries have presented significant results, approaches, knowledge, scenarios, and prototypes. Reworked versions of most of the presented papers are grouped into four parts: Generic Infrastructure Components, External Collaboration, Factory Floor Infrastructure and Man-System Collaboration. Applying principles of architecture descriptions for evolutionary software intensive systems. An introductory paper explains the DIISM problem statement and this book's structure.

As a whole, this compilation will be a great source of information, providing guidance toward design, implementations and utilization of information infrastructure for manufacturing.

The conference was sponsored by the International Federation of Information Processing (IFIP), through Working Groups 5.3 (Computer Aided Manufacturing) and 5.7 (Computer Applications in Production Management). The working conference would not have been a success without the help and hard work of many volunteers. First, we thank the members of the Organizing Committee. Further thanks go to the authors, the members of the International Program Committee and the conference participants for their contribution to the success of the conference and this book.

In conclusion, we strongly hope that this book will have a useful shelf life, and becomes another step towards solving problems of a fabric that we all share.

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Jan Goossenaerts
Fumihiko Kimura
Keiichi Shirase